

This chapter discusses Tucson Electric Power Company's (TEP) proposed action and routing alternatives for building a 345-kV double circuit transmission line from Sahuarita to Nogales, Arizona, continuing to the U.S.-Mexico border. The proposed project includes expansion of the existing South Substation in Sahuarita, construction of a new substation (Gateway Substation) in Nogales, construction of the associated 345-kV transmission line, construction of a 115-kV transmission line from the new Gateway Substation to the existing Valencia Substation, and installation of additional equipment at the Valencia Substation. This chapter describes the process for identifying and evaluating alternatives, provides a detailed description of each alternative, including the No Action Alternative, and describes construction logistics. This chapter also presents a comparison of the expected impacts from alternatives based on the analysis in Chapter 4, and discusses measures to mitigate potential impacts.

Each of the Federal actions addressed in this EIS would individually result in an administrative decision to approve or disapprove a TEP application to implement the actions listed above, whether by permit, ROW grant, or other legally binding authorization. Although such administrative actions are not in themselves likely to impact the environment, they nevertheless *authorize implementation of an action or project* that could. These are applicant-initiated actions that become the "proposed action" or the subject of the impacts analysis upon which a Federal administrative decision is made. Thus, approval of any of the Federal agency actions addressed in this EIS would authorize an applicant-initiated action—the TEP proposal—which has the potential to significantly impact the environment. With this in mind, the focus of the impacts analysis in this EIS is on all aspects of TEP's proposed action, as well as reasonable alternative actions including "no action," which is required to be considered by CEQ regulations at 40 CFR 1502.14(d). The implementation of TEP's proposed action would be dependent upon each agency's administrative approval of a TEP application, with such approval being documented in a ROD independently issued by the agency.

The range of alternatives considered in this EIS are twofold: (1) those that are defined in TEP's proposal and its applications for Federal authorizations to implement different facets of the proposal, and (2) those that are "reasonably foreseeable" by the Federal agencies and that satisfy their respective purpose and need for action, in accordance with direction in the NEPA and CEQ regulations regarding alternatives analysis in an EIS.[42 U.S.C. 4332(E) and 40 CFR 1500.2(e), 1502.14(a), respectively].

## 2.1 ALTERNATIVES

The alternatives developed for the proposed project are alternative routes to interconnect TEP's South Substation with the proposed Gateway Substation. TEP's evaluation of interconnection schemes resulted in the development of three potentially viable corridors for transmission interconnection in southern Arizona. One of these, the Eastern Corridor, was eliminated from further analysis as a reasonable alternative in this Environmental Impact Statement (EIS), as explained in Section 2.1.5. An additional study corridor, the Crossover Corridor, was included for analysis in this EIS based on public and tribal input received during the public scoping period and tribal consultations. Thus, the three alternatives addressed in this EIS are the Western Corridor, the Central Corridor, and the Crossover Corridor. For both the Central Corridor and the Crossover Corridor, two optional routes are addressed: (1) a route that avoids a 1.9-mile (3.1-km) stretch of the existing utility corridor that is designated as an inventoried roadless area (IRA) (see Section 2.1.2 for a more detailed description) and (2) a route that follows the existing utility corridor in the Coronado National Forest.

To facilitate a thorough, specific evaluation of the existing potentially affected environment and of potential environmental impacts of the proposed project, TEP agreed to define a 0.25-mi (0.40-km) wide study corridor for each alternative, within which the 125-ft (38-m) transmission line right-of-way (ROW) would be sited. The precise siting of the transmission line ROW within the selected study corridor would

be based on further engineering evaluation and mitigation of potential impacts on cultural, paleontological, visual, and ecological resources, including provisions of mitigation agreements with Federal, state, and local agencies as listed in Chapter 9, following the issuance of Records of Decision (RODs) by the lead and cooperating agencies.<sup>1</sup>

**TEP Corridor Identification Process.** TEP has provided the following description of their corridor and substation location identification process:

Commencing in 1995, TEP conducted a study to identify potential alternative routes from the U.S.-Mexico border to various tie points on TEP's utility grid. The first phase of this study was to develop an environmental screen to identify areas of concern and define those areas where the potential impacts may be minimal. TEP established a set of principles that was utilized to establish potential transmission line alignments. The principles were:

- Stay within existing utility corridors where possible and to the extent practicable where doing so would not be detrimental to environmental and cultural factors.
- Parallel existing infrastructures such as roads, trails and developed ROWs.
- Follow existing legal or jurisdictional boundaries where possible. Boundaries considered were ownership or parcel boundaries; section, half section and quarter section lines, land grants, patented mining claims, and boundaries of cities, towns, or communities.
- Avoid sensitive or regulatory areas where possible. Areas considered were known habitat of threatened or endangered species, floodplains and regulated water courses, wilderness or conservation areas, known cultural or historical sites, and visual resources.
- Avoid the viewshed of the most concentrated residential areas.

TEP evaluated potential transmission line alignments on the following factors:

- The feasibility of construction and the cost. Included were environmental costs relating to the potential impacts and potential mitigation, the technical feasibility of constructing the transmission line, the construction costs, and the ability to acquire the necessary ROW.
- The ability to acquire all regulatory permits.
- The ability to meet TEP's purpose and need, including providing sufficient electric power reliability for Nogales, Arizona.

The routing of the transmission line was constrained by a need to connect to the existing South Substation at the northern end of the project.

For the proposed Gateway Substation, TEP initially considered the general area of the City of Nogales. TEP chose the area west of Interstate 19 (I-19) due to the dense development within the city and to avoid an unnecessary crossing of a major roadway (I-19). Topography limited the choices on the western side of

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<sup>1</sup> In the process of precise siting of the transmission line ROW, constraints may be identified that require minor deviations from the 0.25-mile-wide study corridor considered in this EIS. If route deviations are proposed, the agencies would review the proposed route changes to evaluate the need for additional NEPA review.

I-19 to two locations. The first location (southern site) was located adjacent to a wash that would have been impacted by the grading necessary to level the site for construction. TEP selected the second site, the proposed Gateway Substation site, because grading activities would not impact any washes or associated natural resources.

Using these principles, TEP identified three alternative corridors, as described in Sections 2.1.1 and 2.1.2, and the Eastern Corridor described in Section 2.1.4. The three corridors overlap each other in certain segments. Refer to Figures 1.1–4 and 2.1–4 for an overview map of the three corridors. Figures 2.1–1, 2.1–2, and 2.1–3 show a close-up view of the Western, Central, and Crossover Corridors as they pass through Sahuarita and Green Valley, Amado, and near Nogales, respectively. Section 2.3 contains a comparison of the alternatives based on the analysis in Chapter 4.

The expansion to the existing South Substation, the construction of the Gateway Substation (and fiber-optic regeneration site) and the Citizens 115-kV transmission line between the Gateway and Valencia substations would be the same for each of the three proposed corridors, as described in Sections 2.2.1 and 2.2.2. The three 3-acre (1.2-ha) construction staging areas and the 80-acre (32-ha) temporary laydown yard would also be the same for each of the three proposed corridors, as described in Section 2.2.3, Construction Yard and Material Handling Sites. The proposed fiber-optic wires would contain at least 48 fibers each (TEP 2003).

### **2.1.1 Western Corridor**

The Western Corridor extends for an estimated 65.7 mi (105 km), from the South Substation to the U.S.-Mexico border, including 9.3 mi (15.0 km) that follows or crosses the EPNG ROW. The Western Corridor crosses 29.5 mi (47.5 km) of USFS land and 1.25 mi (2.0 km) of BLM land. The Western Corridor would require an estimated 429 support structures (monopoles or lattice towers), including an estimated 191 within the Coronado National Forest and 8 on BLM land. Table 4.1–1 lists the estimated areas of land that would be displaced by structures and structure construction sites. TEP would use existing utility maintenance roads, ranch access roads, and, where no access currently exists, new access ways (see Section 4.12). Approximately 20 mi (32 km) of new temporary roads would be built for construction of the Western Corridor on the Coronado National Forest (URS 2003a); spur roads off existing access roads to adjacent TEP transmission lines would provide project access on BLM land (see Figure 3.1–1, Existing Utility Infrastructure). Transmission line tensioning and pulling and fiber-optic splicing sites would also temporarily disturb land (see Section 2.2.3). These sites would range in area from 0.5 to 1.5 acres (0.2 to 0.6 ha). There would be an estimated 12 sites outside of National Forest System lands occupying a total of 18 acres (7 ha), and an estimated 14 sites on the Coronado National Forest occupying a total of 10.5 acres (4.2 ha). The total new temporary area of disturbance on the Coronado National Forest during construction of the Western Corridor would be an estimated 197 acres (79.7 ha) (URS 2003a).

Following construction, TEP would close roads not required for project maintenance and would limit access to maintenance roads, in accordance with agreements with land owners or managers (for example, BLM or U.S. Department of Agriculture Forest Service [USFS]). On National Forest System land, the proposed project would not affect the existing road density because 1.0 mi (1.6 km) of existing classified road would be closed for every 1.0 mi (1.6 km) of proposed road to be used for project maintenance (see Section 4.12, Transportation). The maintenance access required by TEP would be limited to roads leading to selected structures, rather than a single cleared ROW leading to the U.S.-Mexico border. Transmission line tensioning and pulling sites, fiber-optic splicing sites, and construction yard areas would be cleared of construction-related facilities and materials within 6 months of the project becoming fully operational and the areas would be restored in accordance with agreements with land owners or managers.

The Western Corridor, together with the Central and Crossover Corridors, exits the TEP South Substation located within the incorporated area of the Town of Sahuarita and proceed westerly for 1.0 mi (1.6 km) before turning south for 1.5 mi (2.4 km). The corridors turn west across I-19 and continue through Pima County to the southwest, crossing an estimated 1.25 mi (2.0 km) of Federal lands managed by BLM parallel to two existing TEP transmission lines (138-kV and 345-kV). All corridors turn south and follow on the east side of the EPNG pipeline ROW for an estimated 5.8 mi (9.3 km), passing just east of the existing TEP Cyprus Sierrita Substation.

The Western and Crossover Corridors continue south past the Cyprus Sierrita Substation, then separate from the Central Corridor, continue southwest and south and enter Santa Cruz County after approximately 10 mi (16 km). The Western and Crossover Corridors enter the Coronado National Forest 6.0 mi (9.7 km) south of the Santa Cruz County line. While the Crossover Corridor turns east at Peck Canyon, the Western Corridor continues south along the west side of the Tumacacori and Atascosa Mountains, then meets and runs along the south side of Ruby Road as it turns gradually east, north of the Pajarita Wilderness. The Western Corridor continues south of Ruby Road then intersects the EPNG pipeline ROW and the Central and Crossover Corridors.

The Western Corridor, together with the Central and Crossover Corridors, continue through the National Forest System forest land, paralleling the EPNG pipeline ROW to the southeast for several miles to the Coronado National Forest boundary. All corridors exit the National Forest onto private land and proceed 0.5 mi (0.8 km) east to the proposed Gateway Substation. From the Gateway Substation, the corridors return to the west through private land then turn south to parallel the Coronado National Forest boundary. The corridors would meet the U.S.-Mexico border approximately 0.62 mi (1.0 km) west of Arizona State Highway 189 in Nogales, Arizona. |

With respect to the Western Corridor, the Forest Supervisor proposes to issue an authorization that would allow TEP to construct, operate, and maintain a 345-kV transmission line along the route designated in this EIS as the Western Corridor. This route traverses National Forest System lands located in the Tumacacori EMA. Portions of the Western Corridor route crossing the Coronado National Forest are not consistent with management direction in the governing Forest Plan. The Forest Plan would be amended to establish new utility corridor, establish utility corridor width, and change visual quality objectives. The proposed Western Corridor route would establish a new utility corridor through the Tumacacori EMA that joins and then follows the existing utility corridor as depicted in Figure 2.1-4. The width of this new utility corridor would be approximately 660 ft (201 m) on either side of the centerline, or approximately ¼-mi (0.40 km). The total length of this corridor through the Tumacacori EMA is approximately 29.5 mi (47.5 km), encompassing approximately 4,720 acres (1,910 ha). On National Forest System lands, the Western Corridor and its associated facilities would be located in Pima and Santa Cruz Counties, Arizona.

Use of the Western Corridor as a utility corridor would not be consistent with the governing Forest Plan for the Coronado National Forest (USFS, 1986, as amended). Compliance with the consistency requirements of the NFMA would be achieved through simultaneous adoption of the Forest Plan amendments described below.

#### **AMENDMENT TO ESTABLISH NEW UTILITY TRANSPORTATION CORRIDOR**

As shown on Figure 2.1-4, the proposed Western Corridor passes through undeveloped National Forest System lands west of the Tumacacori and Atascosa Mountains in the Tumacacori EMA, then gradually turns east to its point of connection with the existing utility transportation corridor, which is generally concurrent with the EPNG pipeline. The Western Corridor is approximately 29 mi (46.7 km) in length and ¼-mi (0.40 km) in width [approximately 660 ft (201 m) on either side of a centerline]. For consistency purposes, this proposed route is divided into two segments:

1. Segment A: Segment A is approximately 27.5 mi (44.3 km) in length and encompasses approximately 4,440 acres (1,781 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Western Corridor, Segment A, in Figure 2.1-4 and the corridor width would be established as ¼-mi (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
2. Segment B: Segment B is approximately 2 mi (3.2 km) in length and encompasses approximately 320 acres (129.5 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

To make the Western Corridor consistent with the Forest Plan, the Forest Plan Transportation System and Utilities Corridor Map would be modified to include the new utility corridor shown on Figure 2.1-4.

#### **AMENDMENT TO CHANGE VISUAL QUALITY OBJECTIVES IN MANAGEMENT AREAS 1, 3, 4, AND 7B**

Installation of fully aboveground structures such as the proposed transmission line and associated facilities in the Western Corridor would not be consistent with Forest Plan direction for visual quality

objectives. Specifically, the Forest Plan would require amendment to change the visual quality objectives in Management Areas 1, 3, 4, and 7B on 2,303 acres of the Tumacacori EMA. Table 2.1-1 details the changes to Forest Plan text required to bring the proposed action into compliance with Forest Plan direction. For each row in the table, the existing text in the Forest Plan would be deleted and replaced by the amended text.

**Table 2.1-1. Comparison of Existing and Amended Forest Plan Text for Proposed Western Corridor**

<b>Forest Plan Reference</b>	<b>Existing Text</b>	<b>Amended Text</b>
Management Area 1 Page 47 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  12,710 acres Retention 13% 51,819 acres Partial Retention 53% 33,265 acres Modification 33% 978 acres Maximum Modification 1%	Manage the following acres at the indicated visual quality objectives:  12,498 acres Retention 13% 51,819 acres Partial Retention 53% 33,265 acres Modification 33% 1,190 acres Maximum Modification 1%
Management Area 3 Page 55 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  8,125 acres Retention 55% 3,988 acres Partial Retention 27% 2,659 acres Modification 18% 49 acres Maximum Modification <0.4%	Manage the following acres at the indicated visual quality objectives:  8,076 acres Retention 55% 3,988 acres Partial Retention 27% 2,659 acres Modification 18% 49 acres Maximum Modification <0.4%
Management Area 4 Page 62 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  135,201 acres Retention 12% 406,144 acres Partial Retention 36% 440,208 acres Modification 39% 146,736 acres Maximum Modification 13%	Manage the following acres at the indicated visual quality objectives:  133,892 acres Retention 12% 405,534 acres Partial Retention 36% 440,208 acres Modification 39% 148,655 acres Maximum Modification 13%
Management Area 7B Page 71 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  6,165 acres Retention 36% 5,651 acres Partial Retention 33% 4,281 acres Modification 25% 1,027 acres Maximum Modification 6%	Manage the following acres at the indicated visual quality objectives:  6,100 acres Retention 36% 5,651 acres Partial Retention 33% 4,281 acres Modification 25% 1,092 acres Maximum Modification 6%

### 2.1.2 Central Corridor

The Central Corridor extends for an estimated 57.1 mi (91.9 km), from the South Substation to the U.S.-Mexico border, including 43.2 mi (69.5 km) that follows or crosses the EPNG pipeline ROW. The estimated length of the Central Corridor within the Coronado National Forest is 15.1 mi (24.3 km), and it is 1.25 mi (2.0 km) on BLM land. The Central Corridor would require an estimated 373 support structures, including an estimated 102 within the Coronado National Forest and 8 on BLM land. Table 4.1-1 lists the estimated areas of land that would be displaced by structures and structure construction sites. TEP would use existing access where feasible as described for the Western Corridor. An estimated 13.8 mi (22.2 km) of temporary new roads would be built for construction of the Central Corridor on the Coronado National Forest (URS 2003a); spur roads off existing access roads to adjacent TEP transmission lines would provide project access on BLM land. Transmission line tensioning and pulling and fiber-optic splicing sites would also temporarily disturb land (see Section 2.2.3). These sites would range in area from 0.5 to 1.5 acres (0.2 to 0.6 ha). There would be an estimated 14 sites outside of National Forest System lands occupying a total of 21 acres (8.5 ha), and an estimated 7 sites on the

Coronado National Forest occupying a total of 3.3 acres (1.3 ha). The total new temporary area of disturbance on the Coronado National Forest during construction of the Central Corridor would be an estimated 105 acres (42.5 ha) (URS 2003a).

The Central Corridor follows the same route as the Western and Crossover Corridors from the South Substation in Sahuarita to approximately 3 mi (4.8 km) south of the existing TEP Cyprus Sierrita Substation. Refer to Section 2.1.1 for a description of this common segment. The Central Corridor separates from the Western and Crossover Corridors south of the TEP Cyprus Sierrita Substation, continuing to follow or cross the EPNG pipeline ROW to the south.

The Central Corridor approaches to within approximately 1.0 mi (1.6 km) west of I-19, passing the towns of Amado, Tubac, and Tumacacori. The Central Corridor continues approximately 2.0 mi (3.2 km) south of Tumacacori then enters the Coronado National Forest, following the EPNG pipeline ROW. Within the Coronado National Forest, two optional sub-routes are addressed: (1) a route that avoids a 1.9-mi (3.1-km) stretch of the EPNG pipeline ROW that is also designated as an inventoried roadless area (IRA) and (2) a route that follows the EPNG pipeline ROW in the Coronado National Forest (see Figure 3.1-1). The Draft EIS did not include both optional routes because there was a perceived need to avoid that portion of the existing EPNG pipeline ROW that is designated as an IRA. However, based on public comments, the Federal agencies decided that a route following the EPNG pipeline ROW would be a reasonable option for the transmission lines through the Coronado National Forest. Such a route would allow the transmission lines to be constructed and operated in an area that is currently designated as a utility corridor in the governing Forest Plan. Additionally, an optional route within the existing EPNG pipeline ROW would not require creation of a new utility corridor, and would give the USFS greater flexibility in managing the 1.9-mi (3.1-km) stretch of land that is not currently utilized as a utility corridor.

The Central Corridor passes along the eastern edge of the Tumacacori and Atascosa Mountains, crosses Ruby Road, and reaches a point northwest of the Gateway Substation where it rejoins the Western Corridor (see Figure 1.1-4). The Central Corridor is identical to the Western and Crossover Corridors from the point where they join in the Coronado National Forest to the Gateway Substation and the U.S.-Mexico border. Refer to Section 2.1.1 for a description of this common segment.

With respect to the Central Corridor (Option 1), the Forest Supervisor proposes to issue an authorization to allow TEP to construct, operate, and maintain a 345-kV transmission line along the route designated in this EIS as the Central Corridor (Option 1). This route traverses National Forest System lands located in the Tumacacori Ecosystem Management Area as depicted in Figure 2.1-5. Portions of the Central Corridor (Option 1) route crossing the Coronado National Forest are not consistent with management direction in the governing Forest Plan. The Forest Plan would be amended to establish new utility corridor, establish utility corridor width, and change visual quality objectives. The proposed Central Corridor (Option 1) route would establish a new utility corridor through the Tumacacori EMA that joins, and then follows the existing utility corridor. The width of this new utility corridor would be approximately 660 ft (201 m) on either side of the centerline, or approximately ¼-mi (0.40 km). The total length of this corridor through the Tumacacori EMA is approximately 15.1 mi (24.3 km), encompassing approximately 2,416 acres (976 ha).

With respect to the Central Corridor (Option 2), the Forest Supervisor proposes to issue an authorization to allow TEP to construct, operate, and maintain a 345-kV transmission line along the route designated in this EIS as the Central Corridor (Option 2). This route traverses National Forest System lands located in the Tumacacori Ecosystem Management Area as depicted in Figure 2.1-5. Portions of the Central Corridor (Option 2) route crossing the Coronado National Forest are not consistent with management direction in the governing Forest Plan. The Forest Plan would be amended to establish new utility corridor, establish utility corridor width, and change visual quality objectives. The proposed Central

Corridor (Option 2) route would establish a new utility corridor through the Tumacacori EMA that joins, and then follows the existing utility corridor. The width of this new utility corridor would be approximately 660 ft (201 m) on either side of the centerline, or approximately ¼-mi (0.40 km). The total length of this corridor through the Tumacacori EMA is approximately 15.1 mi (24.3 km), encompassing approximately 2,416 acres (976 ha). On National Forest System lands, the Central Corridor and its associated facilities would be located in Santa Cruz County, Arizona.

Use of the Central Corridor (Option 1 or Option 2) as a utility corridor would not be consistent with the governing Forest Plan for the Coronado National Forest (USFS, 1986, as amended). Compliance with the consistency requirements of the NFMA would be achieved through simultaneous adoption of the Forest Plan amendments described below.

#### **AMENDMENT TO ESTABLISH NEW UTILITY TRANSPORTATION CORRIDOR**

As shown on Figure 2.1-5, the Central Corridor is divided into three segments:

1. Segment A: Central Corridor Segment A is approximately 6.7 mi (10.8 km) in length and encompasses approximately 1,072 acres (433.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
2. Segment B (Option 1): Central Corridor (Option 1) Segment B is approximately 1.9 mi (3.1 km) in length and encompasses approximately 304 acres (123.0 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Central Corridor (Option 1), Segment B, in Figure 2.1-5 and the corridor width would be established as ¼-mi (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
3. Segment B (Option 2): Central Corridor (Option 2) Segment B is approximately 1.9 mi (3.1 km) in length and encompasses approximately 304 acres (123.0 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). The Forest Plan does not establish a width for this corridor. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
4. Segment C: Central Corridor Segment C as is approximately 6.5 mi (10.5 km) in length and encompasses approximately 1,072 acres (433.8 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

To make the Central Corridor consistent with the Forest Plan, the Forest Plan Transportation System and Utilities Corridor Map would be modified to include the new utility corridor shown on Figure 2.1-5.

#### AMENDMENT TO CHANGE VISUAL QUALITY OBJECTIVES IN MANAGEMENT AREAS 4 AND 7B

Installation of fully aboveground structures, such as the proposed transmission line and associated facilities in the Central Corridor would not be consistent with Forest Plan direction for visual quality objectives. Specifically, the Forest Plan would require amendment to change the visual quality objectives in Management Areas 4 and 7B on 1,160 acres (469 ha) of the Tumacacori EMA. Table 2.1-2 details the changes to Forest Plan text required to bring the Central Corridor into compliance with Forest Plan direction. For each row in the table, the existing text in the Forest Plan would be deleted and replaced by the amended text.

**Table 2.1-2. Comparison of Existing and Amended Forest Plan Text for Proposed Central Corridor**

<b>Forest Plan Reference</b>	<b>Existing Text</b>	<b>Amended Text</b>
Management Area 4 Page 62 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  135,201 acres Retention 12% 406,144 acres Partial Retention 36% 440,208 acres Modification 39% 146,736 acres Maximum Modification 13%	Manage the following acres at the indicated visual quality objectives:  135,080 acres Retention 12% 406,114 acres Partial Retention 36% 439,346 acres Modification 39% 147,749 acres Maximum Modification 13%
Management Area 7B Page 71 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  6,165 acres Retention 36% 5,651 acres Partial Retention 33% 4,281 acres Modification 25% 1,027 acres Maximum Modification 6%	Manage the following acres at the indicated visual quality objectives:  6,111 acres Retention 36% 5,646 acres Partial Retention 33% 4,233 acres Modification 25% 1,134 acres Maximum Modification 6%

#### 2.1.3 Crossover Corridor

An additional study corridor, the Crossover Corridor, was included for analysis in this EIS based on public and tribal input received during the public scoping period and tribal consultations. The Crossover Corridor extends for an estimated 65.2 mi (105 km), from the South Substation to the U.S.-Mexico border. The estimated length of the Crossover Corridor within the Coronado National Forest would be 29.3 mi (47.2 km) and it would be 1.25 mi (2.0 km) on BLM land. The Crossover Corridor would follow or cross the EPNG pipeline for 17 mi (27.4 km). The Crossover Corridor would require an estimated 431 support structures, including 196 within the Coronado National Forest and 8 on BLM land. Table 4.1-1 lists the estimated areas of land that would be displaced by structures and structure construction sites. TEP would use existing access where feasible as described for the Western Corridor. An estimated 20.7 mi (33.3 km) of temporary new roads would be built for construction of the Crossover Corridor on the Coronado National Forest (URS 2003a); spur roads off existing access roads to adjacent TEP transmission lines would provide project access on BLM land. Transmission line tensioning and pulling and fiber-optic splicing sites would also temporarily disturb land (see Section 2.2.3). These sites would range in area from 0.5 to 1.5 acres (0.2 to 0.6 ha). There would be an estimated 12 sites outside of national forest lands occupying a total of 18 acres (7 ha), and an estimated 12 sites on the Coronado National Forest occupying a total of 7.6 acres (3.1 ha). The total new temporary area of disturbance on the Coronado National Forest during construction of the Crossover Corridor would be an estimated 238 acres (96.3 ha) (URS 2003a).

The Crossover Corridor is identical to the Western and Central Corridors from where it exits the TEP South Substation in Sahuarita to where it separates from the Western and Central Corridors in the Coronado National Forest. Refer to Section 2.1.2 for a description of this common segment.

When the Crossover Corridor separates from the Western Corridor, it turns east through Peck Canyon for an estimated 7 mi (11.3 km). Within this 7 mi (11.3 km) stretch, the Crossover Corridor passes through approximately 3 mi (4.8 km) of an IRA. The Crossover Corridor joins the Central Corridor and the existing EPNG pipeline ROW upon exiting Peck Canyon on the east side of the Tumacacori Mountains. From here, the Crossover Corridor continues south, following the existing EPNG pipeline ROW. Upon reaching the 1.9-mi (3.1-km) stretch that is designated as an IRA, there would be two optional sub-routes: (1) a route that follows the existing EPNG pipeline ROW in the Coronado National Forest and (2) a route that avoids a 1.9-mi (3.1-km) stretch of the existing EPNG pipeline ROW that is also designated as an IRA (see Figure 2.1-6).

The Crossover Corridor is identical to the Western and Central Corridors from the point where they rejoin in the Coronado National Forest to the Gateway Substation and the U.S.-Mexico border. Refer to Section 2.1.1 for a discussion of this common segment.

With respect to the Crossover Corridor (Option 1), the Forest Supervisor proposes to issue an authorization that would allow TEP to construct, operate, and maintain a 345-kV transmission line along the route designated in this EIS as the Crossover Corridor (Option 1). This route traverses National Forest System lands located in the Tumacacori Ecosystem Management Area. Portions of the Crossover Corridor (Option 1) route crossing the Coronado National Forest are not consistent with management direction in the governing Forest Plan. The Forest Plan would be amended to establish new utility corridor, establish utility corridor width, and change visual quality objectives. The proposed Crossover Corridor (Option 1) route would establish a new utility corridor through the Tumacacori EMA that joins, and then follows the existing utility corridor as depicted in Figure 2.1-6. The width of this new utility corridor would be approximately 660 ft (201 m) on either side of the centerline, or approximately ¼-mi (0.40 km). The total length of this corridor through the Tumacacori EMA is approximately 29.3 mi (47.1 km), encompassing approximately 4,688 acres (1,894 ha).

With respect to the Crossover Corridor (Option 2), the Forest Supervisor proposes to issue an authorization that would allow TEP to construct, operate, and maintain a 345-kV transmission line along the route designated in this EIS as the Crossover Corridor (Option 2). This route traverses National Forest System lands located in the Tumacacori Ecosystem Management Area. Portions of the Crossover Corridor (Option 2) route crossing the Coronado National Forest are not consistent with management direction in the governing Forest Plan. The Forest Plan would be amended to establish new utility corridor, establish utility corridor width, and change visual quality objectives. The proposed Crossover Corridor route would establish a new utility corridor through the Tumacacori EMA that joins, and then follows the existing utility corridor as depicted in Figure 2.1-6. The width of this new utility corridor would be approximately 660 ft (201 m) on either side of the centerline, or approximately ¼-mi (0.40 km). The total length of this corridor through the Tumacacori EMA is approximately 29.3 mi (47.1 km), encompassing approximately 4,688 acres (1,894 ha). On National Forest System lands, the Crossover Corridor and its associated facilities would be located in Pima and Santa Cruz Counties, Arizona.

Use of the Crossover Corridor (Option 1 or Option 2) as a utility corridor would not be consistent with the governing Forest Plan for the Coronado National Forest (USFS, 1986, as amended). Compliance with the consistency requirements of the NFMA would be achieved through simultaneous adoption of the Forest Plan amendments described below.

#### **AMENDMENT TO ESTABLISH NEW UTILITY TRANSPORTATION CORRIDOR**

As shown on Figure 2.1-6, the Crossover Corridor is divided into five segments:

1. Segment A: Crossover Corridor Segment A is approximately 10.7 mi (17.2 km) in length and encompasses approximately 1,712 acres (692.8 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Crossover Corridor, Segment A, in Figure 2.1-6 and the corridor width would be established as ¼-mi (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
2. Segment B: Crossover Corridor Segment B is approximately 7 mi (11.3 km) in length and encompasses approximately 1,120 acres (453.2 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Crossover Corridor Segment B, in Figure 2.1-6 and the corridor width would be established as ¼-mi (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
3. Segment C: Crossover Corridor Segment C is approximately 3.2 mi (5.2 km) in length and encompasses approximately 1,072 acres (433.8 ha). This segment is concurrent with route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
4. Segment D (Option 1): Crossover Corridor Segment D (Option 1) is approximately 1.9 mi (3.1 km) in length and encompasses approximately 304 acres (123.0 ha). For this segment, the Forest Plan would be amended by modifying the Transportation System and Utilities Corridor Map to establish new utility corridor in the Tumacacori EMA where none existed before. The mapped location would be as depicted for Crossover Corridor Segment D (Option 1), in Figure 2.1-6 and the corridor width would be established as ¼-mi (0.40 km). Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
5. Segment D (Option 2): Crossover Corridor Segment D (Option 2) is approximately 1.9 mi (3.1km) in length and encompasses approximately 304 acres (123.0 ha). This segment is concurrent with the route of an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.
6. Segment E: Crossover Corridor Segment E is approximately 6.5 mi (10.5 km) in length and encompasses approximately 1,040 acres (420.8 ha). This segment is concurrent with the route of

an existing utility corridor in the Tumacacori EMA depicted on the Transportation System and Utilities Corridor Map in the Forest Plan. For this segment, the Forest Plan would be amended to establish a corridor width of ¼-mi (0.40 km). Corridor width was not previously specified in the Forest Plan. Additionally, management direction in the Forest Plan regarding visual quality objectives would be changed.

To make the Crossover Corridor consistent with the Forest Plan, the Forest Plan Transportation System and Utilities Corridor Map would be modified to include the new utility corridor shown on Figure 2.1-6.

#### **AMENDMENT TO CHANGE VISUAL QUALITY OBJECTIVES IN MANAGEMENT AREAS 1, 4, AND 7B**

Installation of a fully aboveground facility such as the proposed transmission line and associated facilities in the Crossover Corridor route would not be consistent with Forest Plan direction for visual quality objectives. Specifically, the Forest Plan would require amendment to change the visual quality objectives in Management Areas 1, 4, and 7B on 1,549 acres of the Tumacacori EMA. Table 2.1-3 details the changes to Forest Plan text required to bring the proposed action into compliance with Forest Plan direction. For each row in the table, the existing text in the Forest Plan would be deleted and replaced by the amended text.

**Table 2.1-3. Comparison of Existing and Amended Forest Plan Text for Proposed Crossover Corridor**

<b>Forest Plan Reference</b>	<b>Existing Text</b>	<b>Amended Text</b>
Management Area 1 Page 47 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  12,710 acres Retention 13% 51,819 acres Partial Retention 53% 33,265 acres Modification 33% 978 acres Maximum Modification 1%	Manage the following acres at the indicated visual quality objectives:  12,710 acres Retention 13% 51,818 acres Partial Retention 53% 33,265 acres Modification 33% 979 acres Maximum Modification 1%
Management Area 4 Page 62 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  135,201 acres Retention 12% 406,144 acres Partial Retention 36% 440,208 acres Modification 39% 146,736 acres Maximum Modification 13%	Manage the following acres at the indicated visual quality objectives:  135,161 acres Retention 12% 405,840 acres Partial Retention 36% 439,372 acres Modification 39% 147,916 acres Maximum Modification 13%
Management Area 7B Page 71 Visual Resource Management	Manage the following acres at the indicated visual quality objectives:  6,165 acres Retention 36% 5,651 acres Partial Retention 33% 4,281 acres Modification 25% 1,027 acres Maximum Modification 6%	Manage the following acres at the indicated visual quality objectives:  6,165 acres Retention 36% 5,651 acres Partial Retention 33% 3,957 acres Modification 23% 1,351 acres Maximum Modification 8%

#### **2.1.4 No Action Alternative**

CEQ regulations require that an agency “include the alternative of no action” as one of the alternatives it considers (40 CFR 1502.14[d]). In the context of this EIS, “no action” means that TEP’s proposed transmission line is not built. For DOE and the cooperating agencies, “no action” would be achieved by any one of the Federal agencies declining to grant TEP its permission to build in its respective jurisdiction. Thus, in the case of DOE, “no action” means denying the Presidential Permit. For USFS, “no action” means denying the authorization. Because the action alternatives would require amendment of the Forest Plan, “no action” is further defined to mean that the Forest Plan, including the

Transportation System and Utilities Corridor Map, would remain unchanged. Without authorization and associated Forest Plan amendments, the 345-kV transmission line and associated structures would not be constructed on National Forest System lands. Management of lands and resources in the Tumacacori EMA would progress as expected under current management direction. For BLM, “no action” means denying access to BLM-managed Federal lands. Each agency makes its own decision independently, so that it is possible that one or more agencies could grant permission for the proposal while another could deny permission. Thus, if any agency denied permission for the proposed transmission line, it would not be built.

### 2.1.5 Alternatives Considered But Eliminated From Further Analysis

Among the alternatives considered for inclusion in the impacts analysis in this EIS are the following: Eastern, Southeast, and I-19 aboveground 345-kV transmission line routes (see Figure 2.6-1); construction of an underground 345-kV transmission line; construction of a 115-kV transmission line instead of a 345-kV line; siting, construction, and operation of a new power generating facility in Santa Cruz County; construction of a 345-kV line along the same path as existing lower voltage lines in Pima and Santa Cruz Counties; conservation; and upgrade of existing 115-kV transmission line. As discussed in this section, for the purpose of impacts analysis in this EIS, the Federal agencies dismissed each of the preceding alternatives from further evaluation.

When a Federal agency is the proponent of a proposed project, it is responsible, under CEQ regulations at 40 CFR 1502.14, to explore a range of reasonable foreseeable alternatives that meet the underlying purpose and need for the agency to take action. By their very nature, the Federal authorizations that comprise the proposed actions addressed in this EIS inherently constrain the alternatives available to the agencies; that is, the only reasonable alternatives available to DOE, USFS, BLM, and USIBWC are simply choices to approve or deny an authorization. Based on TEP’s alternative identification process, stakeholder input, and consideration by DOE and the cooperating agencies, the following alternatives, as shown in Figure 2.1–7 were eliminated from further analysis.

**Eastern Corridor.** The Eastern Corridor extends for an estimated 60.3 mi (97.0 km) from the South Substation to the international border, including an estimated 12.4 mi (20.0 km) within the Coronado National Forest. The Eastern Corridor exits the South Substation to the east for an estimated 6.0 mi (9.7 km), where it turns south along Wilmot Road and parallels the existing Citizens 115-kV transmission line (east of the community of Sahuarita and west of the community of Corona de Tucson). The Eastern Corridor continues south for another 6.5 mi (10 km) before reaching the turning point of the Citizens Communication Company (Citizens) existing transmission line alignment. At this point, the Eastern Corridor continues to parallel the Citizens transmission line southwest for an estimated 18.4 mi (29.6 km) to the vicinity of Amado-Montosa Road. Leaving the Citizens transmission line, the Eastern Corridor turns southwest for an estimated 2.9 mi (4.7 km) and crosses I-19. At this point, the Eastern Corridor joins TEP’s Central Corridor and turns south along the existing EPNG pipeline ROW an estimated 1.0 mi (1.6 km) west of I-19 through Tubac and Tumacacori before entering the Coronado National Forest. Within the Coronado National Forest, the Eastern Corridor is identical to the proposed Central Corridor and would require adoption of the same Forest Plan amendments described for the Central Corridor in Section 2.1.2 to be in compliance with the NFMA. The Eastern Corridor follows the EPNG pipeline ROW through the Tumacacori and Atascosa Mountains, and turns southeast an estimated 2.8 mi (4.5 km) north of Peña Blanca Lake. At a point northwest of the Gateway Substation, the Eastern Corridor rejoins the Western Corridor. From the point of intersection, the Eastern Corridor follows the Central and Western Corridors to the Gateway Substation and the international border approximately 0.62 mi (1.0 km) west of Arizona State Highway 189 in Nogales, Arizona.

On July 3, 2002, TEP wrote a letter to DOE requesting that the Eastern Corridor alternative, originally proposed by TEP and included in the Notice of Intent (see Section 1.3, Public Participation), be removed from further analysis in the EIS (TEP 2002a). The following summarizes the reasons TEP gave for its request:

1. The route does not provide sufficient reliability for a second feed into Nogales, Arizona. Because the Eastern Corridor parallels the existing Citizens transmission line to Nogales, Arizona for approximately 20 mi (32 km), a single event such as a wildfire could cause the loss of both transmission lines, completely cutting off electricity transmission to Nogales, Arizona.
2. Encroachment along this route would necessitate many property condemnations to develop an adequate ROW. A combined ROW of at least 300 ft (91 m) would be required where the Eastern Corridor parallels the existing Citizens transmission line. Given the houses near the existing transmission line, approximately thirty or more parcels of land would be purchased and condemned.
3. Construction of the Eastern Corridor would require many lengthy outages of the existing Citizens transmission line, given its proximity, thereby cutting off transmission to Nogales during construction.
4. This route is more visually obtrusive than the Western or Central Corridors as expressed by residents of Green Valley, Tubac, and Tumacacori at DOE public scoping meetings and Arizona Corporation Commission (ACC) hearings for the proposed project.

TEP's decision not to pursue the Eastern Corridor alternative renders it infeasible, and DOE, in consultation with the cooperating agencies, has removed this alternative from further consideration in the EIS.

Council on Environmental Quality (CEQ) regulations (40 CFR 1502.14) require Federal agencies to analyze only alternatives that are reasonable, that is, technically and economically practical and feasible. The rule of reason governs which alternatives the agency must discuss and the extent to which it must discuss them. Where a Federal Agency is the proprietor of a proposed project, it will consider the range of reasonable alternatives. However, where a proposed action is advanced by a non-Federal applicant, such as TEP, seeking a permit for a project, an agency ordinarily need not redefine the applicant's proposal or select alternatives that change the applicant's goals (*Citizens Against Burlington, Inc. v. Busey*, 938F.2d 190 [D.C. Cir.], *cert denied*, 502 U.S. 994 [1991]).

Because TEP has asserted that it does not want to pursue a given alternative route and DOE will not decide otherwise, it would be a waste of time and resources to evaluate an alternative that the applicant rejects. Accordingly, DOE has removed the Eastern Corridor from further analysis in the EIS. The applicant bears the risk that if it changes its mind in the future and again proposes the Eastern Corridor alternative, additional environmental review would be required.

**I-19 Corridor.** The I-19 Corridor leaves the South Substation westerly adjacent to the existing TEP 345-kV transmission line until it crosses I-19, where it turns south and continues approximately 46 mi (74 km) to the Mariposa Road exit in Nogales, Arizona, and then turns west to the Gateway Substation. The predominant considerations for eliminating this alternative from further analysis centered on the visual impacts through densely populated areas, and the potential impacts to cultural resources, given the proximity of a majority of the alternative route to the Santa Cruz River. Other considerations included safety and the interruption of I-19 traffic during construction.

**East Central Corridor.** The East Central Corridor follows the existing TEP 138-kV transmission line from the South Substation to the east and south until it reaches the Green Valley Substation at

Whitehouse Canyon Road and the Old Nogales Highway, where it continues south along the railroad to the Pima County and Santa Cruz County boundary. At this point, it turns away from the railroad and proceeds to the southeast until it intersects the existing Citizens 115-kV transmission line at the turning point east of Amado. The alternative then proceeds southeasterly adjacent to the 115-kV line for an estimated 5 mi (8 km) before heading southeast toward Solero Canyon Road skirting the recreation area at Lake Patagonia an estimated 1.2 mi (1.9 km) west of the dam. The alternative proceeds south parallel to the eastern city limit of Nogales, until reaching State Route 82, where it turns and parallels the highway to the southwest for an estimated 2.5 mi (4.0 km) into Nogales. The predominant considerations for eliminating this alternative from further analysis were the impacts on the agricultural areas in the northern segments as the transmission lines would restrict aerial pollination and pest control, the close proximity to existing and proposed residential developments in the Sahuarita, Green Valley, Solero Ranch, and Nogales suburbs, and the hazard potential and height restriction adjacent to the Nogales International Airport.

**Southeast Corridor.** The Southeast Corridor leaves the South Substation to the east for an estimated 6.5 mi (10 km) before heading south along Wilmot Road, where it meets and parallels the existing Citizens 115-kV transmission line. The corridor follows this alignment for an estimated 5 mi (8 km) before both turn southwest for another 18.2 mi (29.3 km) then turn southeast. From this point, the corridor follows the East Central Corridor. This corridor was eliminated from further analysis for the same considerations as the East Central Corridor except that the impact to the agricultural areas was somewhat less and there were fewer residences in the Sahuarita and Green Valley area.

**South 115-kV Connection.** The South 115-kV Connection route provided an alternative within the southern portion of the study area. It could be a sub-route for any of the preceding routes from the point where the existing Citizens 115-kV transmission line turns southeast east of Amado. From the turning point, it goes approximately 5 mi (8 km) south by southeast and then turns south immediately adjacent to the 115-kV transmission line through low-density residential areas east of Tubac and Tumacacori. Further to the south, the route intersects the railroad and bears to the southeast as it enters Rio Rico. From this point, approximately 14.2 mi (22.8 km) north of Nogales, the route alternatively traverses residential development and riparian areas adjacent to the Santa Cruz River. This route was dismissed from further analysis because of the anticipated difficulty in acquiring adequate ROW within the Rio Rico and Nogales areas due to the potential impacts to the riparian areas and habitat, along with the visual impact to the areas east of Tubac and Tumacacori.

**Construction of a Power Generating Station Near Nogales.** This alternative would involve the construction of a new power generating facility within Santa Cruz County, in the proximity of Nogales and the I-19 corridor. A new power plant in Santa Cruz County is not a viable alternative to a new, second transmission line because a new power plant would not satisfy either element of TEP's dual purpose and need for the proposed action. First, a new electrical generating plant would not meet the international aspect of TEP's proposal, in that it would not provide for an interconnection with the Mexican electrical grid. Furthermore, the Arizona Corporation Commission (ACC) has determined that a new power plant would not resolve the electrical reliability problems in Santa Cruz County that led the ACC to issue its decisions mandating the construction of a new transmission line (see Section 1.1.2). As explained in ACC staff comments on the DEIS (ACC 2003a), "new local generation does not pre-empt the need for a second transmission line. This is because the system deficiency is not a supply problem but rather a delivery problem that new generation can not solve. New local generation would be susceptible to tripping off line for a transmission line outage just like the existing Valencia units until a second transmission line connects Nogales to the Arizona grid." It also takes longer to recover from outages when there is only one transmission line connection. Furthermore, the ACC staff comments point out that a second transmission line connection would improve the utilities' ability to maintain consistent voltage in Santa Cruz County. For these reasons, the ACC staff consistently requires that two transmission lines

emanate from a power plant. There would be negative environmental impacts associated with construction and operation of a new power plant. The major impacts would be to air quality, water resources, and visual resources, along with impacts from land disturbance at the generating facility site and along required infrastructure such as connecting transmission lines or fuel supply lines. Impacts from land disturbance could affect biological, cultural, and soil resources. Depending upon the type of power plant, and the size, the major impacts would be: land use (approximately 100-200 acres of land could be disturbed), air quality (most power plant types would emit criteria pollutants), water resources (cooling water would be required for most power plant types), and visual resources. Land disturbance from the power plant could also affect biological resources, including the loss of existing native plant communities. Potential adverse effects to wildlife would include some mortality of individual wildlife, interference with breeding, loss of habitat, and loss of forage plants. Cultural resources could also be affected by land disturbance.

**Combining the Proposed 345-kV Transmission Line with Existing Lower Voltage Transmission Lines.** This alternative would involve combining the proposed 345-kV transmission line with existing lower voltage transmission lines onto a single set of support structures to minimize the creation of new utility ROWs. The existing lower voltage transmission lines in the vicinity of TEP's proposed project, as detailed in the existing infrastructure map shown in Figure 3.11-1, include TEP's 46-kV and 138-kV transmission lines, Arizona Electric Power Company's 230-kV transmission line, TRICO Electric Cooperative, Inc.'s 69-kV transmission line, and Citizens' 115-kV transmission line. This alternative was eliminated from further analysis for the following reasons. The lower voltage transmission lines would be "underbuilt" beneath the 345-kV transmission lines, thus requiring the height of the proposed 345-kV structures to increase at least 30 ft (9.2 m), resulting in increased impacts to the viewshed. Combining different transmission lines onto a single set of support structures would mean that a problem with one structure would affect multiple transmission lines, thus potentially decreasing electrical reliability. This alternative would require adoption of Forest Plan amendments as described in Sections 2.1.1, 2.1.2, and 2.1.3, as appropriate for the route selected for implementation.

**Upgrading Existing 115-kV Transmission Line.** Upgrading the existing 115-kV transmission line (e.g., increasing voltage, replacing structures, replacing conductors) would not alleviate the reliability issues that a second set of transmission lines are intended to alleviate, nor satisfy TEP's dual purpose and need to benefit both southern Arizona and Mexico.

**Conservation of Electricity.** As discussed in Section 1.5, Citizen's has committed to the purchase of 100 MW of transmission capacity from TEP to meet expected future load growth above Citizen's current Santa Cruz County load of approximately 65 MW. Conservation would not pre-empt the need for a second transmission line because the system deficiency is a delivery problem, not a supply/quantity problem. Additionally, electricity conservation would not satisfy TEP's dual purpose and need to benefit both southern Arizona and Mexico.

**Underground Transmission Lines.** It is technically feasible to bury both the 345-kV and 115-kV transmission lines. Burying transmission lines reduces the visual impacts of the transmission lines at ground level to only the disturbances associated with the cleared ROW, and aboveground level to facilities that are required along the transmission line for operational reasons. For approximately every 14 mi (22.5 km) of buried transmission line, intermediate facilities are required to boost the conductor cables' current-carrying ability. There are disadvantages to burying transmission lines, including technical difficulties (reliability and implementation) and potential impacts to environmental resources other than visual resources. A major disadvantage of burying transmission lines is that reliability can be greatly reduced through lengthening power outages, as experience has shown that a failure underground is difficult to locate, and once located, is relatively more difficult to repair. Implementation difficulties include working with geologic conditions such as bedrock (necessitating explosives blasting), and

needing to avoid existing underground utilities such as gas, sewer, phone, and electrical distribution lines in more populated areas. The primary utility to be avoided by TEP's proposed project would be the existing natural gas pipeline in the vicinity of portions of each of TEP's proposed corridors. Given these implementation difficulties, the cost of burying transmission lines can be an estimated 7.5 to 12 times higher than traditional overhead construction for a given project (EEI 2003). Increased environmental impacts result from trenching for the length of the transmission line, resulting in disturbance to soils, biological, and cultural resources. The resulting disturbance is larger than that associated with support structures and access roads for traditional overhead transmission lines. Because of the disadvantages and cost differential associated with burying transmission lines, this alternative is not evaluated in detail in the EIS.

**Reroute the Western and Crossover Corridors to avoid the Caterpillar Facility.** Commentors on the Draft EIS suggested rerouting the Western and Crossover Corridors north of the Coronado National Forest to avoid impacts to the Caterpillar Corporation testing and demonstration facility. The suggested alternative route, shown in Figure 2.1-1, would also be on land owned or leased by Caterpillar Corporation. However, this route is outside the Western Corridor that the ACC directed TEP to use. Accordingly, new ACC approval would be needed in order to reroute the line as suggested. The ACC declined to accommodate Caterpillar's request for rerouting at the January 3, 2002 hearing on the CEC. Because of this limitation and because the agencies have less information about the environmental characteristics of this route than about the corridor alternatives, the suggested reroute option is not available for selection by the agencies at this time. Therefore this suggested reroute was eliminated from detailed analysis in this EIS. However, a field survey conducted by Harris Environmental Group indicates that environmental conditions on this route are similar to those on the portion of the Western or Crossover Corridor that this route would replace (HEG 2004e). Thus, it is likely that the impacts that would occur along the proposed re-route are consistent with those already identified in the assessment for these corridors. If, following the issuance of Federal agency RODs, TEP were to propose use of this alternative route, the Federal agencies would evaluate the need for additional NEPA review.

**Construction of a 115-kV line in lieu of the proposed 345-kV line.** TEP's purpose and need for the proposed project, as provided to DOE in TEP's Presidential Permit Application, is "...to construct a double-circuit 345 kV, alternating current ("AC") transmission line to interconnect the existing electrical systems of TEP and Citizens Utilities ("Citizens") in Nogales, Arizona, with a further interconnection to be made from Nogales, Arizona to the CFE [Comisión Federal de Electricidad, the national electric utility of Mexico] transmission system..." In an applicant-initiated process, such as TEP's proposed project, the range of reasonable alternatives analyzed in detail in the EIS is directly related to the applicant's purpose and need. A smaller transmission line in lieu of the proposed 345-kV line (e.g., a 115-kV line) would not meet the international interconnection aspect of TEP's purpose and need.

## 2.2 ACTIVITIES COMMON TO ALL ACTION ALTERNATIVES

### 2.2.1 **Substation Upgrades and Additions and Fiber-Optic Regeneration Sites**

The expansion of the existing TEP South Substation, installation of additional equipment to the existing Valencia Substation, and construction of the Gateway Substation and fiber-optic regeneration sites, would be the same for each proposed corridor. The South Substation in Sahuarita (see Figure 1.1-4) would be upgraded and expanded to provide interconnection between a new TEP 345-kV transmission line and the new Gateway Substation west of Nogales. The South Substation would be expanded by an estimated 1.3 acres (0.53 ha) to add a switching device that would connect to the proposed transmission line by moving the fenceline 100-ft (30-m) to the east.

The new Gateway Substation (see Figure 1.1–4) would include a 345-kV to 115-kV power transformer to provide power to the local area. The new Gateway Substation would be constructed within a developed industrial park north of Mariposa Road (State Route 189), an estimated 0.5 mi (0.8 km) east of the Coronado National Forest boundary (Northeast ¼ Section 12, Township 24 South, Range 13 East). The TEP portion of the site (the area that would be graded) is an estimated 18 acres (7.3 ha) and is within the City of Nogales, Arizona. TEP has purchased the substation site and preliminary construction activities have been completed.

Preparation of the new substation and substation expansion would require the following:

- Cut-and-fill grading to level the construction area to a smooth surface using existing soil
- Placement and compaction of soil brought in from offsite, as needed, to serve as a foundation for equipment
- Subsurface grounding grids (buried system of conductors to provide safety for workers)
- Grading to maintain drainage patterns
- Oil spill containment facilities
- Gravel-covered parking areas approximately 20 by 40 ft (6 by 12 m)
- Fences and gates
- Revegetation with native plants, leaving a 10-ft (3-m) clear zone around the outside perimeter of the fence for safety and security personnel
- Erosion control, such as placement of gravel within the fenced area

The maximum height of structures in the substations would be approximately 100 ft (30 m). The substation yard would be open-air and would include transformers, circuit breakers, disconnect switches, lightning/surge arresters, reactors (for voltage regulation), capacitors, bus (conductor) structures, and a microwave antenna. Each substation would have a new switchyard control shelter that would be a structure approximately 40 ft (12 m) wide by 60 ft (18 m) long, and approximately 20 ft (6 m) high, and it would be constructed of prefabricated material. Substation facilities would be enclosed by a chain-link fence with a locking gate with night lighting for security that would be shielded to prevent light from spilling offsite.

The substations would be designed and constructed to prevent and control accidental spills from affecting adjacent land uses and from reaching any waterbodies or courses in the vicinity of the switchyard. Containment structures would be constructed at the base of oil-filled equipment to contain spills. If a large volume of oil were to leak from a piece of electrical equipment, an alarm or a failure would occur notifying the operations center of the problem and a trained maintenance crew would be dispatched to the substation immediately to begin repairs and cleanup. Oil Spill Contingency plans and/or Spill Prevention Countermeasure and Control plans would be updated for the expansion of the existing substation. These plans explain clean-up and emergency notification procedures specific to each substation.

The ground level of the substation yard would be graded to direct the flow of water runoff. The yard would be covered with a layer of gravel (4 in [10 cm] or more thick) that would help inhibit erosion from stormwater runoff and discourage vegetation growth in the substation. Berms, or other barriers, also

would be used around the perimeter of the yard (along the fence-line) to control runoff. Where needed, stormwater mitigation measures, such as retention ponds would be designed and constructed to contain runoff.

Fiber optic facilities (e.g., a fiber optic line and splice boxes) will be placed along the transmission line on the proposed transmission structures. In addition, one separate fiber optic facility site, a regeneration site, will be required. The regeneration facility will be placed on private land. The precise location of this regeneration facility site has not been determined, but TEP states that it will likely be located in the area of Township 18 South, Range 12 East, approximately 10 mi (16 km) southwest of Sahuarita. The fiber optic regeneration site will consist of an estimated 0.5-acre (0.2-ha) fenced yard, containing a 10 by 20 ft (3 by 6 m) concrete pad with an equipment house. The cleared area for the equipment house will be approximately 20 by 30 ft (6 by 9 m).

At the existing Valencia Substation, TEP would install the following additional equipment: two 115-kV terminations, three 115-kV power circuit breakers and associated switches, bus, fittings, relay metering, and communication equipment. However, TEP would not expand the facility beyond the existing footprint.

### **2.2.2 115-kV Interconnection of the Gateway and Valencia Substations**

As shown on Figure 1.1-5, TEP would construct a new 115-kV transmission interconnection line from the proposed Gateway Substation to the existing Valencia Substation in Nogales. The length of the 115-kV transmission line would be approximately 3.0 mi (4.8 km) and would include an estimated 20 support structures. The proposed 115-kV transmission line would be built as a single circuit for the majority of the route, and a double circuit for approximately 0.4 mi (0.6 km) between Milepost 2.6 and the Valencia Substation.

The proposed route does not overlap with any proposed TEP corridors for the 345-kV transmission lines. The 115-kV interconnection between the Valencia Substation and the Gateway Substation would be located on privately-owned land and existing right-of-ways. The site of the Valencia Switchyard is owned by UNS, and TEP owns the site for the proposed Gateway Substation. The interconnection would originate at the proposed Gateway Substation and travel south for approximately 0.4 mi (0.6 km) on the west side of an industrial park. The interconnection then continues east through the industrial area for approximately 0.5 mi (0.8 km) before crossing Mariposa Road. The interconnection then follows an existing utility ROW on the south side of an industrial park for approximately 1.1 mi (1.7 km) before crossing I-19. The interconnection continues to parallel an existing 13.5-kV distribution line for approximately 0.6 mi (1.0 km) to meet the existing 115-kV transmission line. The remaining approximately 0.4 mi (0.6 km) would be built as a double circuit transmission line and follow the existing ROW. The interconnection terminates at the Valencia Substation.

### **2.2.3 Transmission Line Structures and Wires**

The proposed project would utilize primarily self-weathering steel single pole structures (monopoles), depicted in Figure 1.1–1. Dulled, galvanized steel lattice tower structures, depicted in Figure 1.1–2, would be used in specified locations for engineering reasons or to minimize overall environmental impacts (for example, impacts to soils or archaeological sites), as explained in Section 2.2.3 (ACC 2002). Monopoles occupy less acreage at the foundation than lattice towers, and monopoles generally allow a narrower ROW. The typical span between lattice tower structures is 1,000 to 1,200 ft (305 to 365 m), compared to 800 to 900 ft (244 to 274 m) between single pole structures, thus requiring fewer lattice tower structures to support a given distance of transmission line route. However, the overall height and breadth of the lattice towers would be greater for increased span lengths. For the proposed project, the distance between

transmission line structures would be between 600 and 1,200 ft (183 and 365 m). Three slight variations of the monopole (the tangent structure, the turning structure, and the deadend structure) that are visually very similar to the monopole in Figure 1.1–3 would be used at various points along the route based on the turning angle of the transmission line and the elevation change between towers. Likewise, a slight variation of the lattice tower structure (the turning structure) that is visually similar to Figure 1.1–4, would be used at various points along the route. The final footprint of each monopole is approximately 25 ft<sup>2</sup> (2.3 m<sup>2</sup>) the final footprint of each lattice tower structure is approximately 3,600 ft<sup>2</sup> (334 m<sup>2</sup>).

The monopoles would be a low reflectance steel material that self-weathers (oxidizes, or rusts) to form a protective surface coating resulting in a color similar to wooden utility poles. The lattice structures would be steel with a galvanized, dulled finish. Self-weathering monopoles require very little ongoing maintenance following construction, aside from initial inspections to ensure that all joints and surfaces are weathering properly. Self-weathering steel is not an option for lattice towers, as the joints on lattice towers could collect moisture that would interfere with the protective coating that prevents corrosion. Galvanized or painted finishes can be used on lattice towers to darken and reduce shine, but the dulling process shortens the life of the finish and painted towers require more access for ongoing maintenance. (Refer to Section 4.2 for a complete discussion of visual impacts and pole treatment options.)

The double-circuit structures would support two 345-kV, three-phase lines. Each circuit of a double-circuit transmission line consists of three phases; each phase consists of two sub-conductors (for a total of twelve transmission line wires). The circuits are each thermally capable of supplying 1,000 MW, but the double circuit path would be operated to transmit a total of 500 MW for operational and reliability considerations.

Under normal circumstances each circuit would carry 250 MW, but in an emergency situation where one circuit is out of service, the remaining circuit could carry the full 500 MW. Operation in this manner is in accordance with Western Electric Coordinating Council's reliability guidelines (WECC 2003). (The Western Electric Coordinating Council is one of ten electric reliability councils in North America composed of electric utilities that promote a reliable electric power system.)

The single pole structures would be approximately 140 ft (43 m) tall with four arms on each side approximately 28 ft (8.5 m) apart to support the conductors and the neutral ground wire. Lattice tower structures would be approximately 140 ft (43 m) tall and would have four arms extending on either side. The minimum height of the conductor above the existing grade would be 32 ft (9.8 m) at maximum expected operating temperature. The neutral ground wire that provides for lightning protection and fiber-optic communications would be supported on the smaller of the four arms above the conductor arms. The proposed fiber-optic ground wires would contain at least 48 fibers each. Splicing sites would be required at certain points along the corridor (to be determined during final project design), and splicing boxes would be attached to the transmission line structures (TEP 2003).

#### **2.2.4 Transmission Line Construction**

Construction of the proposed transmission lines would include the following roughly sequential major activities performed by small crews progressing along the length of line:

- Surveying
- Staging area development
- Structure site clearing/access way establishment

- Foundation excavation
- Construction of tower base
- Structure assembly/erection
- Conductor stringing/tensioning
- ROW cleanup and restoration

The approximate number of personnel and type of equipment required for construction of the transmission lines are shown in Table 2.2–1. Figure 2.2–1 depicts some of the equipment required during construction. TEP anticipates an average construction workforce of 30 individuals, with peak workforce levels reaching 50 individuals for short periods of time. The project would be completed approximately 12 to 18 months after construction begins.

**Table 2.2–1. Typical Personnel and Equipment for Transmission Line Construction**

Activity	No. of Persons	Equipment
Clearing and grubbing	23	Flatbed truck, crawler bulldozer, jeep with auger, backhoe, side boom crane, equipment trailer, water spray truck
Foundation excavation/ construction	21	Flatbed truck, digger truck, loader, track air drill, tractor trailer, side boom crane, rough terrain crane, concrete truck
Structure erection	28	All terrain crane, tractor trailer, boom truck, concrete ready-mix truck, crew cab truck, line truck (bin body), lace boom crane
Conductor stringing	37	Crew cab flatbed, wire puller (truck mounted), crawler dozer, splicing buggy, wire tensioner (truck mounted), tractor and tandem axle reel trailer, pilot wire stringing truck, tractor trailer, truck mounted crane, aerial lift
Cleanup and road closures	9	Flatbed truck, crawler bulldozer, farm tractor with disc harrow

Source: TEP 2001.

**ROW Access.** Access to the selected ROW for construction, operation, and maintenance of the proposed transmission lines would be on existing utility maintenance roads, ranch access roads and trails, and, where no access currently exists, new access ways. Construction access ways would be approximately 12 ft (3.7 m) wide to provide safe workspace for vehicle and construction equipment movement. Construction vehicle access would be along local roads, then along existing and new access roads as described in Sections 3.12 and 4.12. Siting of access roads would be coordinated with the affected property owners, USFS, U.S. Section of the International Boundary and Water Commission (USIBWC), and BLM to establish the most appropriate access to the structure sites. The Roads Analysis (RA) (URS 2003a) for the proposed project reflects TEP’s consultations with USFS for siting and closing roads, including the criteria used by TEP to site proposed roads (see Section 4.13, Transportation). Practices to prevent the introduction or spread of invasive species (nonnative species transferred by human activity) would be established and followed in coordination with state and Federal agencies. Once access routes are selected, vegetation along the edge of the access way would be pruned back to reduce damage during construction operations. Where the slopes are within appropriate limits for the safe operation of the construction equipment, no ground leveling would be done, in order to preserve the natural landform to

near pre-construction conditions. Explosives blasting may be used as needed based on local geologic conditions.

Access by heavy construction equipment would be required to the site of each new structure. In the most sensitive or difficult terrain conditions, the access by construction workers may be by foot, and the materials and heavy equipment may be inserted by helicopter. Survey work would locate the transmission centerline, determine accurate profiles along the centerlines, and determine the exact location and rough profiles of access roads.

**ROW and Structure Site Clearing and Grading.** Preparation of the ROW would vary with ground cover and slope. In areas with a gentle slope and low vegetative cover, vegetation would be pruned to ground level. This method would keep the roots intact and maximize the restoration potential for areas not needed for ongoing maintenance access. This pruning would occur where such vegetation falls within the boundaries of a proposed access way. Cacti would be transplanted or held in designated holding areas along the edges of the access way for later use in revegetation. In areas with uneven terrain, construction crews would blade the ROW as necessary to ensure safe working conditions. All rocks and cut vegetation would be temporarily stockpiled along the ROW edges. This method of limiting the complete removal of vegetation improves the success of reclamation, increases habitat preservation, and decreases the potential for erosion. The placement or scattering of the collected vegetative debris to create habitat or reduce surface erosion would be instituted where the collected vegetative debris would not be considered a potential fire danger. The areas near structure sites would be prepared by the “mobilization and environmental site preparation team” and delineated by flagging or degradable paint where appropriate.

**Construction Yard and Material Handling Sites.** Construction materials would be hauled to the construction yards from the local highways and then transported to structure sites using the methods previously described under ROW and Structure Site Cleaning and Grading. At each new structure site, an area would be disturbed by the movement of vehicles, assembly of structure elements, and other operations. The estimated area required for each monopole during construction is a 100 ft (30 m) radius circle, and each lattice tower would require an estimated 200 by 400 ft (61 by 122 m) area, more than twice the construction area required for monopoles.

Three temporary construction yards of no more than 3.0 acres (1.2 ha) each, and one temporary construction lay down yard of no more than 80 acres (32 ha) would be required. For each proposed corridor, the 3-acre (1.2-ha) yards would be located at the Gateway and South Substation sites, and near the Arivaca Road exit from I-19 in Amado. The 80-acre (32-ha) temporary construction lay down yard would also be located near the Arivaca Road/I-19 interchange in Amado. No construction yards would be located on national forest lands or lands managed by BLM. Temporary construction yards would serve as reporting locations for workers, parking space for vehicles, and storage for equipment and materials.

**Foundation Excavation and Installation.** The pole foundation would depend on the local geologic conditions. In areas of relatively intact bedrock near the ground surface, the poles would be supported on a rock bolted base, in which small holes (less than 6 in [15 cm] in diameter) are drilled into the bedrock and the tower is attached with large bolts. Areas with significant soil horizons would require direct embedment poles. This type of pole installation requires excavation of a shaft wider than the pole using a caisson-drilling rig, and then subsequent backfilling around the pole. In soils with large cobbles (rocks) or soils that tend to collapse, a large pit would be excavated and the pole would be placed in the pit. In such cases, a lean-concrete slurry may be required for backfill of the pit because soils with large cobbles are difficult to compact adequately (Terracon 2002). In extremely sandy areas, water or a gelling agent could be used to stabilize the soil before excavation.

Explosives blasting may be used in any of the three proposed corridors (including portions of each on the Coronado National Forest) as needed depending on geologic conditions. Typically, the depth to which a charge would be placed is approximately 3 ft (0.9 m) below ground level. The charge is limited to fracturing rock in a very localized area. Discharge of material is limited by proper charge design and use of blasting mats, which TEP would place over the excavation to further limit material and dust dispersion. Once the fractured material is removed from the excavation, an additional 3 ft (0.9 m) would be drilled, charged, and blasted. This process would be continued until the desired depth is attained.

Spoil material (excavated soil) would be used for fill where suitable and the remainder would be spread at the tower site. Foundation excavation and installation may require a power auger or drill, crane, material truck, and ready-mix concrete trucks.

**Structure Assembly/Erection.** Erection crews would assemble the structures and, using a large crane, position them in foundation excavations or set them on the rock bolted base. In the event a structure location is not readily accessible by road, TEP would utilize helicopter construction techniques where feasible to install the structure. While tangent monopoles could be installed in sections by helicopter, the heavier angle and dead-end monopole structures exceed the weight capacities of even the largest helicopters. In the event that an angle or dead-end monopole structure would be needed in an inaccessible location, lattice towers would be used in place of the monopole because the lattice tower can be broken into several smaller sections light enough to helicopter to the site. Foundations for the tower could be hand dug using smaller equipment that could also be flown to the site by helicopter. When structures are brought in by helicopter, TEP could bring in equipment and personnel on a less improved road (narrower and requiring less construction disturbance to minimize steep grades and sharp turns). Note that TEP will use monopoles whenever possible. In situations where it is not possible to use monopoles, as discussed above, or where environmental impacts may be reduced due to the increased span between towers, then lattice towers would be constructed.

In accordance with ACC Decision No. 64356 (ACC 2002) requiring the use of lattice towers where their use would minimize overall environmental impacts, the primary criteria that TEP would use to identify locations for lattice towers would be whether the location is readily accessible by road. By using helicopter access to bring in structures where access by road is not available, and using lattice towers where necessary to make helicopter delivery feasible, TEP would minimize the need for new access roads or improvements to existing access roads. This would limit the area of disturbance and reduce potential impacts to a number of environmental resources (for example, soils, biological, cultural, and visual resources). In areas that are readily accessible by road, TEP would generally not use lattice towers as they disturb a larger area (see Section 2.2.2) and require increased ongoing maintenance access. TEP may use lattice towers at locations such as road crossings where their use would allow a longer span between structures. This would allow the structures to be placed farther away from the road, out of the immediate foreground for travelers on the road.

An estimated 20 to 25 structures would be brought in by helicopter for the Peck Canyon portion of the Crossover Corridor because of its topography and inaccessibility, but no structures are currently planned to be brought in by helicopter for the other alternatives (TEP 2003).

**Shield Wire and Conductor Stringing.** Reels of conductor and overhead shield wire would be delivered to wire-handling sites (ranging from approximately 0.5 to 1.5 acres [0.2 to 0.6 ha]) spaced about every 6 to 8 mi (10 to 13 km) along the ROW. Level locations would be selected so little or no earth moving would be required. These sites may have to be cleared of vegetation and would be disturbed by the movement of vehicles and by other activities. The conductors and shield wires would then be pulled into place from these locations. Stringing and tensioning sites and fiber-optic splicing sites would be selected to avoid environmentally sensitive resources, in coordination with land owners and managers. TEP has identified such potential sites on the Coronado National Forest in consultation with USFS (URS 2003a).

Helicopters would be used to install conductors on the support structures once in place. The process of pulling in conductors involves first pulling in small diameter ropes and placing the ropes in the stringing blocks (all done from the air), which are attached at the ends of the support arms and insulators. Once the small diameter ropes are pulled in at each conductor or phase location, the rest of the process is conducted from the ground at each end of the section to be strung. Use of helicopter for this operation would eliminate the need to cross terrain with vehicles to pull in the ropes between each structure, reducing

impacts to the terrain between the pulling sites. The shield or fiber-optic ground wire would be installed in the same manner as described for the conductors.

All construction activities would be coordinated with the appropriate agencies on each side of the border. At a minimum, TEP expects the U.S. Border Patrol to be included. TEP anticipates that this effort would be coordinated with the CFE and does not anticipate any ground disturbing activities within the reserved strip of land (a total of 120 ft [36.6 m]) along the international border (see Section 3.1.1, Land Use). The preliminary design of the project has the last U.S. pole on top of a hill and the first pole on the Mexico side also on top of a hill to adequately span the border (TEP 2003).

**ROW Cleanup and Restoration.** After construction and reclamation are complete, access to the permanent ROW would be on access roads approximately 12 ft (3.7 m) wide, in locations as specified in Sections 3.12 and 4.12, Transportation. TEP would restore access and construction areas not required for maintenance in accordance with agreements with land owners and managers. All construction areas not needed for normal maintenance would be graded to their original contour or to blend with adjacent landforms. Waste construction materials and rubbish from all construction areas would be collected, hauled away, and disposed of at approved sites, such as the Pima County Sahuarita Landfill. All areas to be revegetated would be reseeded with state-certified native seed mix meeting the requirements of native plant ordinances in Santa Cruz and Pima Counties to minimize erosion and to meet the requirements of native plant ordinances. Any damaged gates and fences would be repaired. To restrict access to maintenance roads, TEP would place barriers, boulders, fences, or locked gates across the maintenance roads as needed to meet the requirements of USFS, BLM, or private landowners.

**Safety Program.** TEP would require the transmission line contractor to prepare and conduct a safety program (subject to TEP's approval) in compliance with all applicable Federal, state, and local safety standards. The safety program would include, but not be limited to, procedures for accident prevention, use of protective equipment, medical care of injured employees, safety education, fire protection, and general health and safety of employees and the public. TEP would also establish provisions for taking appropriate actions in the event the contractor fails to comply with the approved safety program.

## **2.2.5 Operation and Maintenance**

Use of the land in the ROW by the landowners would be permitted for any purpose that does not create a safety hazard or interfere with the rights of TEP. The day-to-day operation of the transmission line would be directed by system dispatchers in a power control center in Tucson. These dispatchers use communication facilities to operate circuit breakers that control the transfer of power through the lines. These circuit breakers also operate automatically to ensure safety in the event of a system incident such as a structure failure or a conductor failure.

An Annual Plan of Operations, that would be included as part of a USFS Special Use Permit, and a Plan of Development for BLM land, would require regular inspections for access control measures, drainage control, etc. TEP's preventative maintenance program for transmission lines would include routine aerial and ground patrols. Aerial patrols would be conducted twice a year, or upon operation of safety equipment that takes the transmission line out of service. Ground patrols would be conducted as necessary to detect equipment needing repair or replacement. Maintenance may include repairing damaged conductors and replacing damaged and broken insulators. Transmission lines are sometimes damaged by storms, floods, vandalism, or accidents and require immediate repair. Emergency repair would involve prompt movement of crews to repair damage and replace any unrepairable equipment. If access roads are damaged as a result of the transmission line repair activities, TEP would repair them as required.

Various practices would be utilized by TEP, in accordance with recommendations in this EIS, to prevent the introduction or spread of noxious weeds (invasive species which displace native species). Because of

the arid nature of the proposed project area, very minor and infrequent measures would be necessary to control vegetation. TEP would not use any types of herbicides during the construction or long-term maintenance of the proposed transmission line ROW. TEP would continue their standard practice of using herbicides at substations as needed (TEP 2002b).

### **2.2.6 Standard Mitigation**

TEP's Standard Mitigation Practices are documented in TEP's Environmental Protection Provisions submitted to the ACC (TEP 2001). Additional mitigation, if required, would be in agreements, permits, or ROW grants from land owners or managers (for example, in the Plan of Development agreement with BLM), in stipulations by the ACC, and in the U.S. Fish and Wildlife Service (USFWS) Biological Opinion. Table 2.2–2 presents the mitigation practices included in the proposed action.

**Table 2.2–2. TEP Mitigation Practices Included in the Proposed Action**

1. All construction vehicle movement would be restricted to the ROW, designated access, contractor-acquired access, or public roads. Widening or upgrading of existing access roads would be limited as necessary for TEP to implement the selected alternative. New road construction would be minimized as practicable.
2. Structures would be placed to avoid sensitive features such as riparian areas, water courses, and cultural resource sites, or to allow electric wire conductors to clearly span the features within limits of standard structure design. This would minimize the amount of disturbance to the sensitive features.
3. Construction activities would be limited to the pole construction areas, staging areas, laydown area, and access described in this EIS, with activity restricted to and confined within those limits. TEP would develop a system of colored identification flags or survey markers to identify restricted areas such as wildlife zones, archaeological sites, or ROW boundaries. TEP would arrange mandatory preconstruction seminars and training sessions to acquaint field personnel with these provisions. No paint or permanent discoloring agents would be applied to rocks or vegetation to indicate limits of survey or construction activity.
4. In construction areas where recontouring is not required, vegetation would be left in place wherever possible and original contour would be maintained to avoid excessive root damage and allow for resprouting.
5. In construction areas (e.g., construction yards, tower sites, spur roads from existing access roads) where ground disturbance is substantial or where recontouring is required, surface restoration would occur as required by the landowner or land management agency. The methods of restoration normally would consist of returning disturbed areas to their natural contour or to blend with adjacent landforms, reseeding (if required), installing cross drains for erosion control, placing water bars in the road, or filling ditches. These instances would be reviewed on a case-by-case basis to limit access into the area and visual disturbance.
6. Watering facilities and other range improvements would be repaired or replaced, if they are damaged or destroyed by construction activities, to their condition prior to disturbance as agreed to by the parties involved.
7. Towers and/or ground wire would be marked with highly visible devices, such as colored balls or lights, if required by governmental agencies (e.g., Federal Aviation Administration, U.S. Air Force). Consultations with these agencies regarding required visual markers for each corridor are ongoing, as documented in Appendix A. It is currently anticipated that no visual markers such as colored balls or lights would be required for the proposed project. Per FAA direction, TEP would comply with all State of Arizona tower requirements.

**Table 2.2–2. TEP Mitigation Practices Included in the Proposed Action (*continued*)**

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8. Prior to construction, all supervisory construction personnel would be instructed on the protection of cultural, paleontological, and ecological resources, including mitigation measures required by Federal, state, and local agencies. To assist in this effort, the construction contract would address (a) Federal and state laws regarding antiquities, fossils, plants and wildlife, including collection and removal; and (b) the importance of these resources and the purpose and necessity of protecting them.
  9. Cultural resources would be treated during post-EIS phases of project implementation according to the Programmatic Agreement regarding Historic Properties. Historic properties inventory of the selected transmission line corridor and associated facilities and access routes will be completed in a manner consistent with the Secretary of the Interior's Standards and Guidelines for Identification of Historic Properties. In consultation with appropriate land managing agencies such as USFS and BLM, and the State Historic Preservation Officer (SHPO), specific mitigation measures would be developed and implemented for National Register of Historic Places (NRHP)-eligible resources to mitigate any identified adverse impacts. Wherever possible, power poles, access roads and any other ground-disturbing activities would be placed to avoid direct impacts to cultural resources. A professional archaeologist would assist the pole-siting crew in avoiding impacts to archaeological and historic sites. In cases where avoidance of sites is not feasible, a site-specific Treatment Plan and Data Recovery Plan would be developed in consultation with tribes, the appropriate land-managing agencies, and the Arizona SHPO. These plans will include an appropriate Plan of Action to implement the Native American Graves Protection and Repatriation Act. A Discovery Plan would be developed to establish procedures to be followed in the event of discovery of unanticipated cultural resources, and a Monitoring Plan would address issues of site protection and avoidance. Native American groups, tribes, and communities would be consulted to determine whether there are effective or practical ways of addressing impacts on traditional cultural properties and archaeological sites.
  10. TEP would respond to and resolve individual complaints of radio or television interference generated by the transmission line.
  11. TEP would apply mitigation needed to eliminate problems of induced currents and voltages onto conductive objects sharing an ROW to the mutual satisfaction of the parties involved.
  12. All construction and maintenance activities would be conducted in a manner that would minimize disturbance to vegetation, soils, drainage channels, and intermittent or perennial streambanks in accordance with the Coronado National Forest Annual Maintenance Plan, BLM requirements, and all state, county, and local requirements. TEP would follow Best Management Practices (BMPs) for the construction of the entire length of the selected corridor. In addition, all construction activities would include dust-control measures. All existing roads would be left in a condition equal to or better than their condition prior to the construction of the transmission line, in accordance with USFS or BLM.
  13. All requirements of those entities having jurisdiction over air quality matters would be adhered to and any permits needed for construction activities would be obtained.
  14. Fences and gates would be repaired or replaced to their original condition prior to project disturbance as required by the landowner or the land management agency if they are damaged or destroyed by construction activities. Temporary gates would be installed only with the permission of the landowner or the land managing agency.
  15. No non-biodegradable debris would be deposited anywhere in the project vicinity. Slash and other biodegradable debris would be left in place or disposed of in accordance with agency and/or landowner requirements.
  16. If required, mitigation measures developed during the consultation period under Section 7 of the *Endangered Species Act* (ESA) would be adhered to as specified in the Biological Opinion of the USFWS. Also, TEP would adhere to mitigation developed in conjunction with state and tribal authorities.
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**Table 2.2–2. TEP Mitigation Practices Included in the Proposed Action (*continued*)**

17. Regulated materials would not be released onto the ground or into streams or drainage areas. Totally enclosed containment would be provided for all trash. All construction waste including trash and litter, garbage, other solid waste, petroleum products, and other potentially hazardous materials would be sent to a disposal facility authorized to accept these materials, such as the Pima County Sahuarita Landfill.
18. The ROW would be aligned to the extent practicable to reduce impact on the residences and inhabitants nearby.
19. Special status species or other species of concern would continue to be considered during post-EIS phases of project implementation in accordance with management policies set forth by the appropriate land managing agency. This may entail TEP conducting surveys for plant and wildlife species of concern along the proposed transmission line route and associated facilities (i.e., access and spur roads, staging areas) as agreed upon by USFS, BLM, USFWS, Arizona State Game and Fish Department, and TEP. In cases where such species are identified, appropriate action would be taken to avoid adverse impacts on the species and its habitat and may include altering the placement of roads or towers as practicable, monitoring construction activities or seasonal restrictions such as not constructing during breeding seasons. The project would be designed and constructed in accordance with raptor protection guidelines, as referenced in Section 4.3, Biological Resources.
20. The alignment of any new access roads would be designed to minimize overall impacts, including ground disturbance and visual impacts.
21. As smoke is a conductor of electric current, when a fire is in the vicinity of the proposed 345-kV transmission lines, firefighters would monitor for possible fire starts outside the fire perimeter. Firefighters would remain at a distance that would not leave them vulnerable to the electric current or shock.
22. Practices such as cleaning of construction equipment, to prevent the introduction or spread of invasive species, would be developed and followed in accordance with applicable requirements.
23. As a condition of the Certificate of Environmental Compatibility issued by the ACC to TEP in January 2002, TEP would be obligated to “meet and confer with landowners who are within or adjacent to the Route Corridor and other interested parties in order to develop a plan for specific pole locations that will mitigate the environmental and visual impact of the Project transmission lines within the Route Corridor.” TEP would meet with each landowner and discuss impacts to their particular property, including any issues that a particular landowner has before finalizing the alignment of the transmission line and the location of access roads. During any such discussions, it is possible that TEP will propose locating the transmission line or access roads outside of the 0.25-mi (0.40-km) wide study corridor that is analyzed in this EIS. If that were to happen, TEP would be required to consult with the Federal agencies to determine if additional NEPA review and/or NFMA review is necessary. In addition, if the ultimate location is outside the ACC’s 2-mile approved corridor, then ACC approval would be necessary.
24. Use water or a gelling agent in sandy areas prior to excavation.
25. Use blasting mats to reduce and control dust emissions.
26. Transplant cacti and agave.
27. In revegetation efforts, use approved native seed mixes.
28. The transmission line would be included on the Forest Flight Hazard Map, which is provided to pilots working on USFS projects in the area, and visual flight rules would apply in the area.

## 2.3 COMPARISON OF ALTERNATIVES

Table 2.3–1 presents a comparison of the alternatives based on the analysis in Chapter 4.

The resource areas evaluated for potential impacts are:

- Land use
- Recreation
- Visual resources
- Biological resources
- Cultural resources
- Socioeconomics
- Geology and soils
- Water resources
- Air quality
- Noise
- Human health and environment
- Infrastructure
- Transportation
- Minority and low-income populations (environmental justice)
- Cumulative impacts

The following discussion emphasizes the environmental implications of choosing among alternatives, organized by resource area. Where impacts are similar among the Western, Central, and Crossover Corridors, these alternatives are referred to collectively as the action alternatives (as compared to the No Action Alternative). Impacts during construction (approximately 12 to 18 months) and operation of the project are considered. This discussion is followed by Table 2.3–1, which provides a more quantitative look at the differences among alternatives. Discussions below for the Central and Crossover Corridor are based on detailed analysis of Option 1, the subroute that avoids the Inventoried Roadless Area in the Coronado National Forest. For most resource areas (visual resources, socioeconomics, water resources, air quality, noise, human health, infrastructure, and environmental justice), no potential for differences in impacts between Options 1 and 2 has been identified. Differences between the subroutes are described in the table for those resource areas for which there is a potential for the choice of subroute to affect impacts (land use and recreation, biological resources, cultural resources, geology and soils, and transportation). In general, the No Action Alternative has the least impact on the environment as it does not involve ground disturbing activities or introduction of a transmission line into the visual landscape.

**Land Use.** The Central Corridor is shorter than the Western and Crossover Corridors. The Western and Crossover Corridors each have a longer segment on the Coronado National Forest than the Central Corridor. All three corridors are identical with respect to BLM land and cross the U.S.-Mexico border in the same location.

Temporary land use impacts would occur as a result of support structure construction areas, staging areas, and temporary access roads that would be re-vegetated in accordance with agreements with land owners or managers and closed following construction. Besides physically changing the use of the land either temporarily or permanently, land use changes can impact all other resource areas as described below. Monopoles, which would be the primary support structure used by TEP, require a smaller area of disturbance (25 ft<sup>2</sup> [2.3 m<sup>2</sup>]) than lattice tower structures (3,600 ft<sup>2</sup> [334 m<sup>2</sup>]), and lattice towers require more ongoing access for maintenance. The temporary area of new disturbance on the Coronado National Forest would be greatest for the Crossover Corridor, followed by the Western Corridor and the Central Corridor. The total land area occupied by the final footprint of the towers for the entire corridor is less than 0.3 acres (0.12 ha) for each action alternative. In addition, access roads would be required to some support structures.

Management direction in the Forest Plan is not consistent with some aspects of each of the routing corridors discussed in this EIS. Therefore, one or more Forest Plan amendments, including amendments to change land use allocations by establishing a new utility corridor, are associated with each of the alternative routing corridors as described in Sections 2.1.1, 2.1.2, and 2.1.3 of the Final EIS.

Because the Central Corridor has the longest segment that follows or crosses an existing EPNG pipeline ROW, fewer new access roads would be required than for the other alternatives, although considerable upgrade would be required for some existing pipeline ROW access roads. On BLM land, the project is adjacent to existing transmission lines within a utility corridor. Outside the Coronado National Forest, each proposed corridor is compatible with current land use and land use plans.

**Recreation.** Activities in the project area include hiking, biking, birding, photography, rock climbing, horseback riding and off-road vehicle use. These activities are mostly concentrated within portions of the Coronado National Forest, and along the east side of the Tumacacori Mountains where the Central Corridor follows outside of the Coronado National Forest boundary. Off-road vehicle use occurs more broadly throughout the project area. The primary impact to these activities would be a change in the visual setting where recreation occurs. None of the three corridors are visible from Peña Blanca Lake on the Coronado National Forest, a popular location for recreation.

DOE, in consultation with USFS performed a USFS Recreation Opportunity Spectrum (ROS) analysis for the proposed project on national forest land evaluating the project's impact on seven setting indicators (characteristics) established by USFS that contribute to a recreation experience. All alternative corridors would negatively impact ROS settings. The Central Corridor has the least impact on ROS settings, mainly because it would minimize the total mileage on National Forest System lands. The Western and Crossover Corridors have higher total mileage on the Coronado National Forest, and therefore have greater overall impacts to ROS settings on the Coronado National Forest.

**Visual.** Visual impacts would occur from the introduction of steel support structures, access roads, and transmission line wires into the landscape. Structures would be primarily 140-ft (43-m) high self-weathering monopoles, similar in color to wood utility poles. With the exception of a reduction in existing High Scenic Integrity (degree of intactness and wholeness of the landscape) associated with the Western and Crossover Corridors near the Pima and Santa Cruz County line, the existing Moderate to Low Scenic Integrity would not be reduced for the area crossed by each corridor outside of the Coronado National Forest, including the BLM land. The Central Corridor has the longest length outside of the

Coronado National Forest, and would be visible to more residents than the other corridors given its closer proximity to the towns of Amado, Tubac, and Tumacacori.

On the Coronado National Forest, per analysis using the USFS Scenery Management System (SMS), the area of land that would have reduced Scenic Integrity as a result of construction and operation of the Western or Crossover Corridors is approximately double the area of reduced Scenic Integrity for the Central Corridor. The Western Corridor would be in wide-open view from a longer stretch of Concern Level 1 (primary) travelways on and nearby the Coronado National Forest than the Central or Crossover Corridors would be. While siting the Western Corridor transmission line immediately adjacent to portions of Ruby Road would have a maximum visual impact along Ruby Road, it would protect the viewshed to the south (towards the Pajarita Wilderness) for the public (including photographers) and would eliminate the need for highly visible access roads in this portion of the Western Corridor.

The Central Corridor would minimize the total mileage on national forest land resulting in reduced Scenic Integrity of approximately 9,668 acres (3,912 ha) on national forest land. The Western and Crossover Corridors would have higher total mileage on national forest lands than the Central Corridor, and the Western and Crossover Corridors would result in approximately 18,511 to 18,736 acres (7,491 to 7,582 ha) of reduced Scenic Integrity on national forest lands. Accordingly, the Western and Crossover Corridors would have greater overall visual impact on the Coronado National Forest than the Central Corridor.

**Biological Resources.** There is a potential for impacting habitat of existing native plant communities located within the ROW and new access road areas during construction. Clearing would be limited to areas required for access roads and structures. Because the proposed project would be in an arid area, where vegetation recovers very slowly, disturbances due to construction could have long-term impacts.

The Western Corridor has the highest potential for adverse effects to special status species. All three proposed corridors cross federally designated Critical Habitat for the Mexican spotted owl. There are approximately 54,881 acres (22,210 ha) of designated Critical Habit within the Coronado National Forest. The corridors include the current range and habitat types for 7 to 10 species listed under the ESA. The federally listed endangered Pima pineapple cactus is known to occur in each of the three proposed corridors. Additional species-specific surveys would be conducted for the selected corridor before construction activities begin. DOE has initiated formal consultation under Section 7 (a)(2) of the ESA with the U.S. Fish and Wildlife Service (USFWS). The formal consultation process between DOE, USFS, BLM, and USFWS began when DOE tendered its biological assessment of the alternatives to USFWS (see Appendix A). To date, the USFWS has issued a Biological Opinion for the Western Corridor concurring with the analysis in the Biological Assessment (see Appendix D), which concluded that the proposed action may affect special status species, but is not likely to have adverse effects.

**Cultural Resources and Tribal Concerns.** The Federal agencies have initiated consultation under Section 106 of the NHPA with the State Historic Preservation Officer (SHPO) and Native American tribes. The Federal agencies are preparing a Programmatic Agreement that will guide the treatment of cultural resources under provisions of Section 106 of the NHPA. The Arizona SHPO and the Advisory Council on Historic Preservation are expected to participate in the Agreement; Native American tribes will be invited to participate. Although only a small percentage of each corridor has been surveyed, multiple prehistoric and historic archaeological sites have been identified within each alternative. The highest density of cultural resource sites is anticipated along the Central Corridor segment near the Santa Cruz River. The impacts could include direct disturbance by construction activities, and the alteration of the landscape.

Prior to ground-disturbing activities in any approved corridor, a complete on-the-ground inventory would be conducted by professional archaeologists. Efforts to identify cultural resources would also include

historical document research and continued consultation with Native American tribes regarding potential traditional cultural properties and sacred sites. Identified cultural resources would be evaluated in terms of National Register eligibility criteria and potential project effects in consultation with all parties who are participants in the Programmatic Agreement. Cultural resource sites identified during pre-construction inventory would be avoided to the extent possible.

DOE initiated Government-to-government consultation with the tribal governments of the 12 Native American tribes that have traditional ties to the area: Ak-Chin Indian Community, Fort Sill Apache Tribe, Gila River Indian Community, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui Tribe, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'Odham Nation, White Mountain Apache Tribe, Yavapai Apache Nation, and Pueblo of Zuni. Consultation has included information-sharing meetings with DOE and its representatives, and site visits arranged at the tribes' requests. The initial tribal consultations were for the Western, Central, and Eastern Corridors, originally proposed by TEP.

Representatives of several tribes have stated that they are opposed to the project, but they would prefer that the project be constructed along the Central Corridor, if it is to be built at all. The Hopi Tribe has stated objection to the Central Corridor based on the probable greater density of archaeological sites in that alternative. No specific traditional cultural properties have been identified along any of the alternatives to date. During meetings and field trips tribal representatives from the Tohono O'Odham Nation, Gila River Indian Community, Salt River Pima Maricopa and Ak-Chin Indian Communities have stated objections to the Crossover Corridor because it is in largely undisturbed territory.

**Socioeconomics.** The construction costs of each of the three action alternatives are roughly similar, approximately \$70 million plus or minus \$7 million. The construction of any of the three proposed corridors would create approximately 30 direct (construction) jobs, and approximately 31 indirect (service-related) jobs, which would benefit Santa Cruz and Pima Counties. No influx of population or stress to community services would be expected from project construction. No socioeconomic impacts would be expected from project operation because most jobs created would be filled by current residents.

During the public scoping process for the Draft EIS, several commentors expressed concern that existence of the proposed transmission line would negatively impact real property values. In this context, any decrease in property values would be perception-based impact, that is, an impact that does not depend on actual physical environmental impacts resulting directly from the proposed project, but rather upon the subjective perceptions of prospective purchasers in the real estate market at any given time. Courts have long recognized that such subjective, psychological factors are not readily translatable into quantifiable impacts. See, for example, *Hanly v. Kleindienst*, 471 F.2d 823, 833 n.10 (2d Cir. 1972), *cert. denied*, 412 U.S. 908, (1973). People do not act consistently in accordance with negative perceptions, and one person's negative perception might be another's positive. Also, perceptions of value may change over time, and perceptions of value are affected by a host of other factors that have nothing to do with the proposed project. Accordingly, any connection between public perception of a risk to property values and future behavior would be uncertain or speculative at best, and therefore would not inform decision making.

There have been studies of the impact of transmission lines and property values in other geographic areas. See, for example, discussion of these studies in the *Environmental Impact Statement for Schultz-Hanford Area Transmission Line Project* (DOE 2002). Based on these studies, DOE can conclude only that, at worst, it is possible that there might be a small negative economic impact of short duration to some properties from the project, and that the impact on value would be highly variable, individualized, and unpredictable. The studies at most conclude that other factors, such as general location, size of property, and supply and demand factors, are far more important criteria in determining the value of residential real estate.

Accordingly, while DOE recognizes that a given property owner's value could be affected by the project, DOE has not attempted to quantify theoretical public perceptions of property values should the proposed project be built.

**Geology and Soils.** The construction of any of the three proposed corridors would not impact geologic resource availability or mine tailing piles west of Interstate 19 in the northern portion of the project. Slope stability analysis for potential tower locations in mountainous areas would prevent slope failure. Low to moderate seismic risk would be considered in structure design. Direct embedment pole construction techniques (requiring excavation) would be used in unconsolidated soils, while rock bolted bases would be used in areas of relatively intact bedrock near the ground surface. Best Management Practices (BMPs) to minimize soil and water impacts would be developed in coordination with USFS, BLM, and Arizona Department of Environmental Quality (ADEQ) before construction, and would be implemented for the entire corridor selected.

All three proposed corridors cross small areas of soils considered to be prime farmland when irrigated.

**Water Resources.** No adverse impacts to surface water or groundwater resources from any of the three action alternatives or the no action alternative. Each of the three proposed corridors would span across a number of drainages and washes, and TEP would avoid placing structures in and near these areas where feasible.

Some corridor access roads would be within 100-year floodplains and the South Substation expansion is conservatively assumed to be in the 500-year floodplain of the Santa Cruz River and could result in increases in flood elevation, potentially leading to an increase in downstream flood loss and a long-term negative impact on lives and property. Impacts resulting from pole placement and construction of laydown areas would be negligible. Impacts to floodplains would be avoided to the extent possible by siting access roads and laydown areas outside floodplains, spanning floodplains where feasible and floodproofing measures at the South Substation. The Western and Crossover Corridors would have the greatest potential to impact floodplains in the project area.

There may be small areas of wetlands within the proposed corridors that are associated with manmade stockponds and impoundments. TEP would site the transmission line to avoid such areas. None of the corridors cross any eligible or designated Wild and Scenic Rivers.

Restrictions on refueling locations would protect groundwater from contamination from fuel, lubricants and other fluids during construction. BMPs would be implemented along the length of the line for erosion control.

**Air Quality.** There are no significant differences in air quality impacts from any of the three action alternatives or the no action alternative. Temporary, localized fugitive dust emission impacts from construction activities would occur. Impacts from operation and maintenance activities would be limited to dust from occasional access by TEP. A conformity review of the proposed project (required under Section 176[c] of the *Clean Air Act*) was conducted in accordance with EPA and DOE guidance (DOE 2000). The review shows that construction project emissions of PM<sub>10</sub> (particulate matter with an aerodynamic diameter less than or equal to 10 microns) and CO (carbon monoxide) for each alternative are below regulatory thresholds and would not constitute a regionally significant action.

**Noise.** There are no significant differences in noise impacts from any of the three action alternatives or the no action alternative. Noise levels would increase above background during construction of any action alternative. Temporary construction noise increases would primarily impact residents in Sahuarita and Nogales for all three corridors, and also Amado, Tubac, and Tumacacori for the Central Corridor. Temporary construction noise would also impact recreationalists, especially in more remote areas of the

Western and Crossover Corridors. Long-term noise from the corona effect on transmission lines would generally be lost in background noise. Gateway and South Substations operational noise would be near background levels for the nearest receptors.

**Human Health and Environment.** Long term electric and magnetic field (EMF) exposure at the nearest residences, schools, and commercial establishments would be well below average daily exposure to maximum magnetic fields (0.8 milligauss) from some common household appliances. There would be no health effects from this exposure. Though each proposed corridor passes primarily through undeveloped land, the Central Corridor would have the highest number of houses in close proximity to the transmission line. The project would be designed to minimize EMF and prevent electrical field effects. A minimum distance of 100 ft (30 m) would be maintained between any of the proposed transmission line structures and the edge of the existing EPNG pipeline ROW.

**Infrastructure.** There are no significant differences in infrastructure impacts from any of the three action alternatives. The proposed project would increase electric transmission facilities to Nogales, Arizona and Mexico, but would not otherwise affect existing infrastructure. Minimal municipal solid waste generated during construction and operation would be taken to appropriate landfill facilities. No hazardous waste would be generated from substation operation.

**Transportation.** Project access would be on existing utility maintenance roads, ranch access roads and trails, and new access ways where no access currently exists. Because the Central Corridor has the longest segment following the EPNG pipeline ROW, fewer temporary new access roads would be required than for the other alternatives, although considerable upgrade would be required for existing pipeline ROW access roads. Access to the proposed project on BLM land would be the same for all three action alternatives, on existing access from Mission Road to TEP's current transmission lines, with new spur roads to the proposed project. Short-term traffic disruptions on major roads such as I-19 or Ruby Road could occur during construction.

On the Coronado National Forest, the Crossover Corridor passes through approximately 3 mi (4.8 km) of an IRA along Peck Canyon. No roads would be constructed along that portion of the route; instead, helicopters would be used to insert structures as needed for the Crossover Corridor. Traveling south along the existing utility corridor, both the Central Corridor and the Crossover Corridor consider two optional routes: (1) a route that follows the existing utility corridor in the Coronado National Forest and (2) a route that avoids around a 1.9-mi (3.1-km) stretch of the existing utility corridor that is designated as an IRA. TEP would build more miles of temporary new roads for the Western or Crossover Corridors than for the Central Corridor. In addition, more areas on existing roads would require minor repairs for the Western and Crossover Corridors than for the Central Corridor. Under Option 2 of the Central and Crossover Corridors, some upgrades to existing roads would be required to access the 1.9 mi (3.1 km) IRA. By siting the Western Corridor immediately adjacent to Ruby Road for approximately 4 mi (6 km), the need for new project access and ongoing maintenance access for this segment would be reduced. There would be no net increase in roads in the Coronado National Forest.

**Environmental Justice.** Neither the three action alternatives nor the No Action Alternative would cause disproportionately high and adverse impacts to the minority or low-income populations. No means were identified for minority or low-income populations to be disproportionately affected from impacts to any of the resource areas.

**Cumulative Impacts.** This EIS includes analysis of cumulative impacts, as required under NEPA, that could occur as a result of the potential impacts of TEP's proposed project when added to impacts from other past, present, and reasonably foreseeable future actions. The potential effects are evaluated both for the period of project construction (anticipated to be 12 to 18 months), and for the post-construction

(operation) period of the project. The region of influence (ROI) varies for each resource area, primarily depending on the distance a potential effect can reach.

The following actions have been evaluated as reasonably foreseeable and are included in the analysis of cumulative impacts: other transmission line projects in the project area, industrial development, other activities under special use permits on the Coronado National Forest, and more generally defined possible actions in the project area such as residential development, increased operations of the U.S. Border Patrol, ongoing activity of undocumented immigrants near the U.S.-Mexico border, and local initiatives to protect biological resources, such as are found in the Sonoran Desert Conservation Plan.

The cumulative impacts from the combination of TEP's proposed project and other past, present, and reasonably foreseeable actions could affect land use (including recreation), visual resources, biological resources, cultural resources, socioeconomic resources, geology and soils, water resources, air quality, noise, human health and environment, and transportation. These potential cumulative impacts are primarily related to long-term development of land that is currently undisturbed or used for other activities such as ranching and recreation. In the short term, if multiple projects are under construction simultaneously, an increased amount of land could be used temporarily for construction lay down yards and staging areas, and an increased amount of airborne dust could be generated. The cumulative change in land use could affect natural habitats, special status species, and cultural resources, and could lead to an increase in soil erosion and local water use. The cumulative impacts to human health and environment could be an increase in background EMF exposure to residents in the immediate vicinity of overlapping transmission line projects. No long-term cumulative human health impacts are expected to occur. No means were identified for disproportionately high and adverse impacts to minority or low-income populations, and TEP's proposed project would not contribute cumulatively to any environmental justice impacts.